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GB A 2068570

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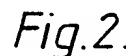
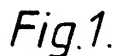
(58) Field of search

G1W

Selected US specifications from IPC sub-class G01G

(54) **Spring balance**

(57) A spring balance has a member (22) slidably mounted in a housing (7) and having a bottom portion to which an object to be weighed is attached by a clip (25). The upper part of the member (22) is bifurcated, with one arm having a toothed rack (33) in engagement with a pinion (15) connected to a rotatable dial (18) and the other arm connected to a tension spring (28). The dial (18) has metric and Imperial scales reading on pointers (20) formed in an opening (21) in an arm (8B) of an inverted U-shaped metal part (8).



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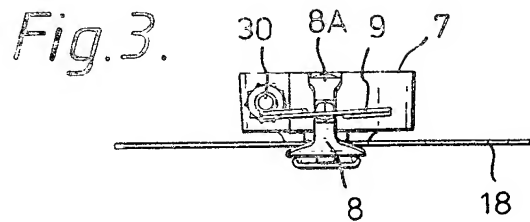
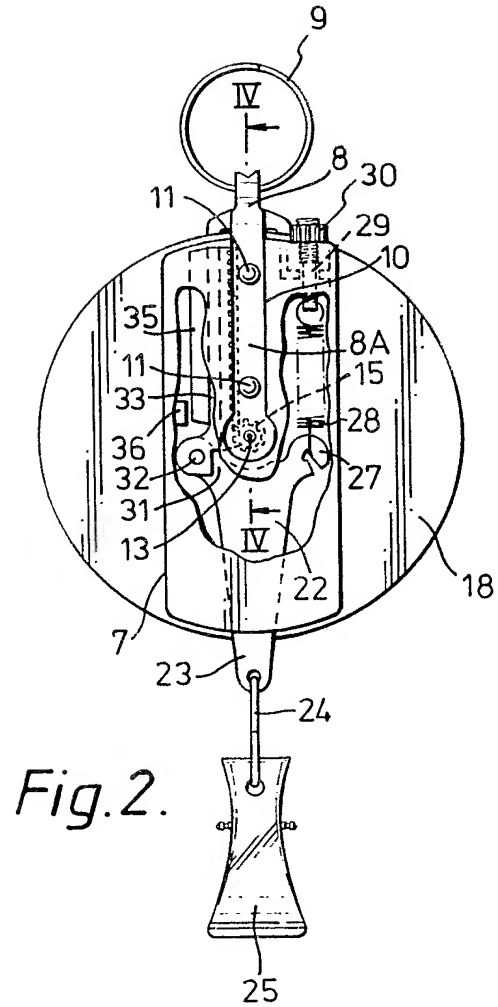
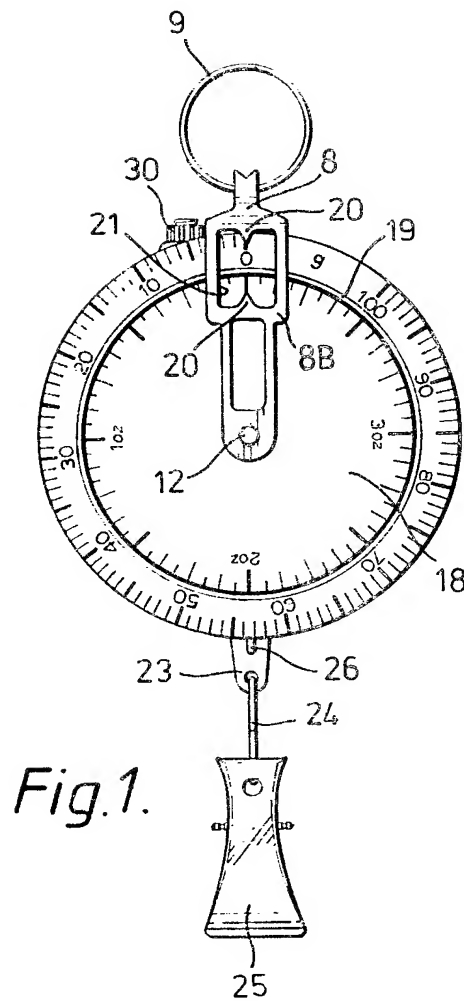


Fig. 4.

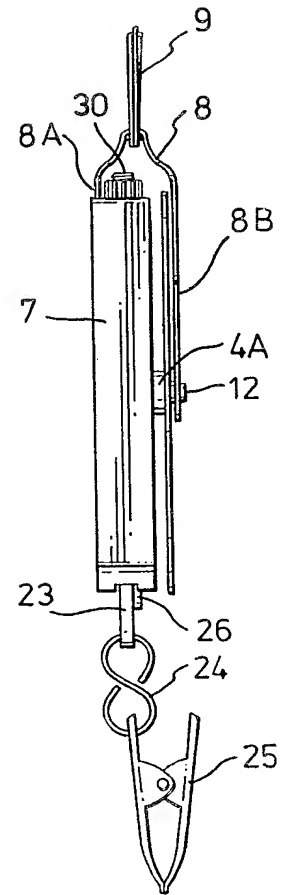
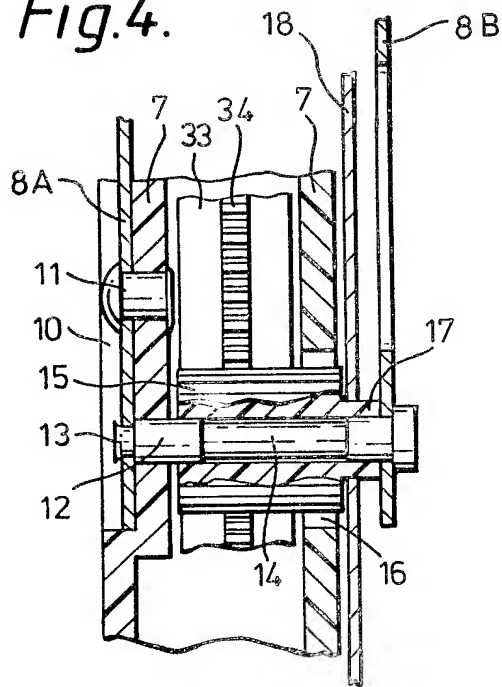


Fig. 5.

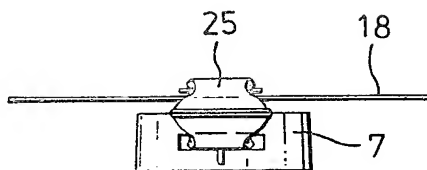


Fig. 6.

SPECIFICATION

Spring balance

- 5 This invention relates to spring balances for weighing light objects, in particular mail such as envelopes.

Spring balances usually have a housing in which a member is slidably mounted. The object to be weighed is connected to the end of the slidable member which protrudes out of the lower end of the housing, and this is conveniently done by either providing a small pan or a hook or clip for holding directly the object. The force resulting from the weight of the member and object is opposed by a spring which acts between the member and the housing.

The movement of the slidable member relatively to the housing is used to give an indication of the weight of the object, and this is usually done in one of two ways. Firstly, the slidable member may have a pointer fixed directly thereto and the linear displacement of the member indicates the weight of the object upon a linear scale. Alternatively, the slidable member may be provided with a toothed rack portion along its length, and this rack engages a pinion so that the linear motion of the member is converted into rotary motion of the pinion, which is linked to the rotatable part of a relatively rotatable pointer and dial arrangement.

Previously, spring balances having the latter type of arrangement have been used for weighing relatively large masses, and have, accordingly, been both bulky and heavy.

According to the present invention, a spring balance comprises a housing having means for suspending the housing from a support; a pinion, within the housing, connected to and rotatable with a rotatable part, outside the housing, of a relatively rotatable pointer and dial; and a member which is vertically slidable in the housing and has a lower part protruding from the housing and arranged to suspend a load to be weighed, an upper part of the slidable member being bifurcated to provide a first portion, which carries a rack engaging one side of the pinion, and a second portion, which extends up past the opposite side of the pinion and comprises a tension spring connecting the slidable member to an upper part of the housing.

This construction results in the balance being compact since the spring is positioned alongside the pinion.

The first portion may be pivotally connected to the lower part of the slidable member and held in engagement with the pinion by a rubbing portion of the housing which abuts against the side of the first portion remote from the rack, preferably at a position substantially opposite the pinion. This ensures even contact between the rack and pinion

even when the lower part of the slidable member is tilted by a suspended load.

The lower part of the slidable member may have a non-circular cross section, e.g. a T-section, which is complementary to the profile of an aperture in the housing through which the member projects. This arrangement helps to restrain laterally the slidable member.

Preferably, the pointer is attached to the housing and the dial to the pinion. In contrast to the more usual arrangement of a pointer moving over a fixed scale, this avoids visual distortion of following a moving pointer as the user only has to focus on the fixed pointer to obtain an accurate weight reading.

If the pointer is provided by a substantially U-shaped part, the housing and dial may be positioned between the arms of the U-shaped part with a spindle, for enabling rotation of the pinion and dial, mounted between the ends of the arms. If the arm overlying the dial is made sufficiently wide, a cut-out or other type of hole may be provided in this arm and arranged for the actual graduations on the dial face, which indicate the weight of the object, to lie beneath the cut-out, thereby facilitating the easy and accurate reading of the weight of an object.

The lower part of the elongate member preferably has a spring-biased clip for carrying the load.

An example of a spring balance in accordance with the present invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is a front view;

Figure 2 is a diagrammatic rear view;

Figure 3 is a plan;

Figure 4 is a diagrammatic part section taken on the line IV-IV in Figure 2;

Figure 5 is a side view; and,

Figure 6 is an underneath plan.

The illustrated balance comprises a moulded plastics housing 7 which is suspended between arms 8A and 8B of an inverted U-shaped metal part 8, carrying a ring 9, by means of which the balance may be hung on a hook or other support. The arm 8A of the part 8 is received in a slot 10 in the outer face of the adjacent wall of the housing 7 and is secured to the wall by a pair of rivets 11. A brass pin 12 passes through the arm 8B, the walls of the housing 7, and the far arm 8A, where its end is enlarged at 13 to secure the pin in position. The pin has a central slightly reduced diameter portion 14. A moulded plastics pinion 15 is rotatably supported within the housing 7 on the full diameter end portions of the pin 12. This intermittent support reduces rotational friction. An end of the pinion 15 extends out through a hole 16 in one wall of the housing and has an extension 17 in the form of a bush on which a rotary dial 18 is mounted. The bush 17 extends through a hole in the dial, the hole

having two diametrically opposed notches into which complementary ribs on the outer surface of the bush are received, to key the dial onto the bush, whereby the dial 18 rotates with the pinion 15.

The dial 18 carries metric and imperial scales 19 to be read through an opening 21 in the arm 8a, the opening being provided with fixed pointers 20 for alignment with respective ones of the scales.

Within the lower part of the housing 7 is slidably mounted a flat, Y-shaped moulded plastics member 22, the extreme tail 23 of which extends out through an opening 24 in the bottom of the housing and carries via a metal link 24 a spring clip 25 for supporting, e.g., an envelope to be weighed. The tail 23 carries a vertical rib 26 which slides through a complementary notch in the edge of the opening 24 to inhibit twisting of the member 22.

One arm of the Y of the member 22 is formed as a hook 27 onto which the lower end of a helically coiled tension spring 28 is hooked. The upper end of the spring is hooked onto the lower end of a plastics bolt 29, a screw threaded upper end of which passes up through an opening in the top wall of the housing 7 and carries an adjustment nut 30. The other arm 31 of the Y-shaped member 22 is pivotally connected by a pin 32 to the lower end of a moulded plastics rack member 33 having a rack 34 engaging the teeth of the pinion 15. The opposite face of the rack member is provided with a projecting rib 35 which bears against a rubbing block 36 fixed to the inner surface of the adjacent wall of the housing 7. The rack member 33 and spring 28 thus extend upwards on opposite sides of the pinion and the axis of the pivotal connection provided by the pin 32 is horizontal and parallel to the axis of rotation of the pinion 15 and of the pin 12.

It will be appreciated that attachment of a load to the clip 25 will draw the member 22 downwards against the action of the spring 28, whereby the rack 34 will rotate the pinion 15 and hence the dial 18, until, at an equilibrium position, when the extension of the spring 28 supports the load, the corresponding weight can be read from the dial 18 by means of one of the pointers 21. A zero adjustment is made by adjusting the nut 30, until the zero point of the scale 18 is opposite the pointers 21, at which time the weight of the parts 22, 33, 24, and 25 will be supported by the appropriate extension of the spring 28.

CLAIMS

1. A spring balance comprising a housing having means for suspending the housing from a support; a pinion within the housing, connected to and rotatable with a rotatable part, outside the housing, of a relatively rotatable pointer and dial; and a member which is verti-

cally slidable in the housing and has a lower part protruding from the housing and arranged to suspend a load to be weighed, an upper part of the slidable member being bifurcated to provide a first portion, which carries a rack engaging one side of the pinion, and a second portion, which extends up past the opposite side of the pinion and comprises a tension spring connecting the slidable member to an upper part of the housing.

2. A spring balance, in which the first portion is pivotally connected to the lower part of the slidable member about an axis parallel to that of the pinion and is held in engagement with the pinion by a rubbing portion of the housing which abuts against the side of the first portion remote from the rack.

3. A spring balance according to claim 2, in which the rubbing portion is located substantially opposite the pinion.

4. A spring balance according to any one of the preceding claims, in which the lower part of the slidable member has a non-circular cross section which is complementary to the profile of an aperture in the housing through which it projects.

5. A spring balance according to claim 4, in which the cross section is a T-section.

6. A spring balance according to any one of the preceding claims, in which the pointer is attached to the housing and the dial is attached to the pinion.

7. A spring balance according to claim 6, in which the pointer is provided by a substantially U-shaped part, the housing and dial are positioned between the arms of the U-shaped part and a spindle for enabling rotation of the pinion and dial is mounted between the ends of the arms.

8. A spring balance substantially as described with reference to the accompanying drawings.

CLAIMS

Amendments to the claims have been filed, and have the following effect:

Claim 1 above has been deleted or textually amended.

New or textually amended claims have been filed as follows:

1. A spring balance comprising a housing having means for suspending the housing from a support; a pinion within the housing, connected to and rotatable with a rotatable part, outside the housing, of a relatively rotatable pointer and dial; and a member which is vertically slidable in the housing and has a lower part protruding from the housing and arranged to suspend a load to be weighed, an upper part of the slidable member being bifurcated to provide a first portion, which carries a rack engaging one side of the pinion, and a second portion, which extends up past the opposite side of the pinion and which comprises a ten-

sion spring, connecting the slidable member to an upper part of the housing and providing the sole means for biasing the slidable member back into the housing.

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